UCRL-JC-125999 Pt 2 Abs

Abstract Submitted
for the PAC97 Meeting of
The American Physical Society

Sorting Category:

**Theory of Longitudinal Beam Halo in RF Linacs: 2. Effects of Nonlinear RF Focusing** STEVEN M. LUND, JOHN J. BARNARD, *Lawrence Livermore National Laboratory*[1] — Longitudinal rf focusing about the synchronous particle is intrinsically nonlinear due to the sinusoidal variation of the synchronous rf wave. For beam bunches with a significant axial phase width this sinusoidal variation of the rf field can strongly influence halo structures in the longitudinal phase space of the beam. Here we employ the core/test particle model described by the authors[2] to investigate this effect for a beam bunch with uniformly distributed space charge within an ellipsoidal envelope. We characterize nonlinear rf modifications to halo structures described in reference 1 that are produced by a resonant interaction between the longitudinal particle oscillations and a mismatch oscillation in the beam envelope. Bifurcations in the primary resonant structure are explained in terms of the falloff in the longitudinal particle oscillation frequency with increasing particle amplitude. The possibility of particle loss from the synchronous rf bucket induced by these halo structures is explored.

[1]Work performed under the auspices of the U.S. D.O.E. under LLNL contract W-7405-ENG-48

[2]J.J. Barnard and S.M. Lund, "Theory of Longitudinal Beam Halo in RF Linacs: 1. Effects of Transverse/Longitudinal Coupling," these proceedings.

☐ Prefer Oral Session
☒ Prefer Poster Session

John Barnard
jjbarnard@llnl.gov
Lawrence Livermore National Laboratory

Date submitted: January 10, 1997 Electronic form version 1.1